RESPONSE UNDER 37 C.F.R. 1.111

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Title: THERMAL INTERFACE APPARATUS, SYSTEMS, AND METHODS

Assignee: Intel Corporation

IN THE CLAIMS

No claims are amended, but all pending claims are reproduced below for convenient reference by the Examiner:

- 1. (Original) An apparatus, comprising:
- a unitary layer of electrically non-conductive material having a first surface adjacent a heat sink, a second surface adjacent a heat source, and a plurality of openings communicatively coupled between the first surface and the second surface, wherein a combined area the plurality of openings comprises a selected percentage of the first surface.
- 2. (Original) The apparatus of claim 1, wherein selected ones of the plurality of openings comprise a regular geometric shape.
- 3. (Original) The apparatus of claim 2, wherein the regular geometric shape is substantially circular.
- 4. (Original) The apparatus of claim 2, wherein the regular geometric shape is substantially square.
- 5. (Original) The apparatus of claim 1, wherein selected ones of the plurality of openings comprise an irregular geometric shape.
- 6. (Original) The apparatus of claim 1, wherein the combined area of the plurality of openings comprises at least about 90% of the first surface.
- 7. (Original) The apparatus of claim 1, wherein the combined area of the plurality of openings comprises no more than about 95% of the first surface.

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8. (Original) The apparatus of claim 1, wherein the combined area of the plurality of openings comprises a selected percentage of the first surface and the second surface, wherein the selected percentage of the second surface is different from the selected percentage of the first surface.

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- 9. (Original) The apparatus of claim 1, wherein the unitary layer of electrically non-conductive material comprises:
 - a polymer.
- 10. (Original) The apparatus of claim 1, further comprising:
 a thermal interface material located between the unitary layer of electrically nonconductive material and the heat sink.
- 11. (Original) The apparatus of claim 1, wherein the unitary layer of electrically non-conductive material comprises:

 a non-woven material.
- 12. (Original) The apparatus of claim 1, wherein the unitary layer of electrically non-conductive material comprises:

 a plurality of glass beads.
- 13. (Original) The apparatus of claim 1, further comprising:
 a thermally conductive material located in selected ones of the plurality of openings, the thermally conductive material selected from at least one of a solid, a liquid, and a paste.
- 14. (Original) An apparatus, comprising:
 - a heat source;
 - a heat sink; and

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a unitary layer of electrically non-conductive material having a first surface adjacent the heat sink, a second surface adjacent the heat source, and a plurality of openings communicatively coupled between the first surface and the second surface, wherein a combined area of the plurality of openings comprises a selected percentage of the first surface.

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- 15. (Original) The apparatus of claim 14, wherein the unitary layer of electrically non-conductive material comprises:
 - a polymer.
- 16. (Original) The apparatus of claim 14, wherein the unitary layer of electrically non-conductive material has a substantially uniform thickness of about 0.05 mm.
- 17. (Original) The apparatus of claim 14, further comprising:

 a thermal interface material located between the unitary layer of electrically nonconductive material and the heat source.
- 18. (Original) The apparatus of claim 14, wherein the heat source comprises an integrated circuit package including a transponder.
- 19. (Original) The apparatus of claim 14, wherein the heat source comprises a die.
- 20. (Original) The apparatus of claim 14, wherein the heat sink comprises a heat spreader.
- 21. (Original) The apparatus of claim 14, wherein the combined area of the plurality of openings comprises no more than about 90% of the first surface.
- 22. (Original) The apparatus of claim 14, wherein the combined area of the plurality of openings comprises no more than about 95% of the first surface.

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23. (Withdrawn) A system, comprising:

- a wireless transceiver;
- a die including a die surface and a circuit electrically coupled to the wireless transceiver;

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- a heat sink; and
- a unitary layer of electrically non-conductive material having a first surface adjacent the heat sink, a second surface adjacent the die surface, and a plurality of openings communicatively coupled between the first surface and the second surface, wherein a combined area of the plurality of openings comprises a selected percentage of the first surface.
- 24. (Withdrawn) The system of claim 23, wherein the wireless transceiver comprises: a transponder.
- 25. (Withdrawn) The system of claim 23, wherein the unitary layer of electrically non-conductive material comprises:

a polymer.

26. (Withdrawn) A method, comprising:

coupling a heat sink to a first surface of a unitary layer of electrically non-conductive material; and

coupling a heat source to a second surface of the unitary layer of electrically non-conductive material, wherein the unitary layer of electrically non-conductive material has a plurality of openings communicatively coupled between the first surface and the second surface, and wherein a combined area of the plurality of openings comprises a selected percentage of the first surface.

27. (Withdrawn) The method of claim 26, further comprising:

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applying a thermally conductive material selected from at least one of a solid, a liquid, and a paste to selected ones of the plurality of openings.

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- 28. (Withdrawn) The method of claim 26, further comprising: compressing the unitary layer of electrically non-conductive material between the heat sink and the heat source.
- 29. (Withdrawn) The method of claim 26, wherein the unitary layer of electrically non-conductive material comprises:

 a polymer.
- 30. (Withdrawn) The method of claim 26, further comprising: coupling a wireless transceiver to a circuit included in the die.